THE PARA-TYMPANIC ORGAN (PTO) of VITALI : a documental * continuing forgotten request to the SCIENCE

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continuing forgotten request to the SCIENCE

** Supposed PTO function's "evidence based " records – twenty years woodpigeons' Europe migration monitoring – from the field , updated 2018*

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ABSTRACT

The writing architecture of the present paper is built for on-line reading .



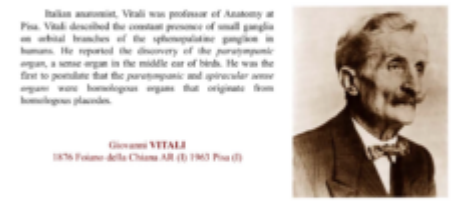
The provocative image is exhaustive of the Abstract's text

A cry of indignation to the Science

Key-words : PTO – wood pigeon's migration – counts – anatomy- waves & peaks – Air Pressure (hPa) – isobars- abiotic factors – "evidence based" data – Research

FOR ANY PROBLEM ON THE WEB-LINKS , please, COPY and PASTE on the window of GOOGLE search motor .







INTRODUCTION

Unfortunately the interest in the specific research on the sensitive organ Paratympanic of Vitali (PTO) (1-2-3-4-5-6) , remains as “zero” despite many typologies of open research’s fields over PTO and related questions and still unsolved answers from the Science .

It is basic to say “ *PTO is used daily by enormous number of living animals (200-300 billions of birds) but represents currently one of the major unsolved mysteries and challenges in sensory physiology of vertebrates* “ (8) (Giannessi F. and co-Aut.,2013).

We have explored many items concerning PTO by retroactive and

real-time analysis of “evidence based” data from Bibliography,Web-bibliography,Archives and from the field as previously published (35-35-41) .

The basic question is as following : “ *why 200-300.000 woodpigeons in stop-over started all together in few minutes by a mass-takeoff , continuing transcontinental migration ?* “ as happened 31 October 2017 from Mesola forest (Ferrara-Italy) fully documented and by the video https://youtu.be/pGK6z9SY8Cg (Denis Bianchi -2017) and our forecast 4 days before the event.

Mass-continuing-fly at same altitude (altimetric function) and isobaric corridors as by video 2018 from Pamplona (Spain) https://youtu.be/4Tb5kGRagtg –https://youtu.be/ty6pdmkSdGo

What,where is the finger pushing the bottom of the takeoff , and by what typology of command ? It happened also in other sites and past years in Italy and Europe . Many elements suggest that the focus must be on PTO and its sensitive barometric altimetric function , as also we supposed by retroactive archives-research on woodpigeons (and other birds) autumn migration (41).

The text of our precedent short-paper “ *PTO in migratory birds: research’s failure or challenge ?* “ (http://www.scienceheresy.com/ornithologyheresy/Cavina2016.pdf 2016 –) (38)seems still valid but -by our personal opinion- the balance is lowering to permanent failure despite so much fascinating topic : the text of mentioned short-paper should be considered as introductive to the present updating and discussion .

MATERIALS and METHODS

RESULTS

The present -2018- collected data integrate the precedent data collected in 2014 (http://www.scienceheresy.com/ornithologyheresy/Cavina2015.pdf and https://www.researchgate.net/publication/328336987 2018 -) (41)

The supposed barometric function of PTO in wild migratory birds is strictly linked with the decision-making-time to the migration mass take-off and/or birds' populations departing in concentrated waves from origin and stop-over sites

Many data (biotic and abiotic) factors concerning this item have been reported and discussed in a first paper on-line (*"Decision making of autumn migrations of woodpigeons (Columba palumbus) in Europe: analysis of the abiotic factors and atmospheric pressure changes" – November 2014 - http://www.scienceheresy.com/ornithologyheresy/Cavina2015.pdf*) (41) .

All the data-results also in graphics of analysis on many abiotic factors and specifically on the changes in Air Pressure values controlled along the migration flyways , seem –also at present time November 2018 in updating review – as clearly indicative concerning the relationship between migration takeoff's decision-making and jumps of Air Pressure before the take-off.

https://plus.google.com/photos/103942035281038458760/albums/6086432829554328737

Many of details reported and discussed are connected with data – updated 2018- collected in Falsterbo (SE) and Pyrenees (FR) and authorized to be used by direct Official local Institutions (personal communication emailed 2014).

These data concerning migration waves(**W-3 days more)** and peaks (**PK-1-2 days**) –updated November 2018 – are here reported as following and are in relation

- with the jumps **(more 10 hPa)** of Air Pressure (AP)
- and 12-24 h before takeoff (**j-1**) or 24-48 h before takeoff (**j-2**) – none jump (**j-0**)
- and total/year as 1999 (148.360)

All the meteo-data as basic of the retroactive analysis ,available to be documentative , are on-line by many Meteo Websites , but in our work mostly by

"Weather History – wunderground "
https://www.wunderground.com/history/

" www.wetterzentrale.de " as by the Link and isobaric maps http://www.wetterzentrale.de/en/reanalysis.

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By these Links it's possible to check all the old or ancient meteo-data day by day, hour by hour, locality by locality, year by year .

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Why the focus on the Air Pressure in atmosphere ? The answer is : high values of Air Pressure are warranty for stable isobaric altitudinal corridors in migration's flyway without turbulences and connected economy of energies .

The focus is on "PEAKS" & "waves" on the following analysis . (41)

*** *** ***

SWEDEN south (13.660.418 woodpigeons counted in 20 years)

Falsterbo Bird Observatory – data from ARCHIVES –

https://www.falsterbofagelstation.se/index_e.html

- ***1999*** *(148.360)*

TWO waves– 6-7-8 Oct. (W-34643) (j-1) – 12-13-14 Oct. (W-43.835)(j-0)

- ***2000****(333.125)*

TWO waves-ONE peak – 15-16-17 Oct.(W-40540)(j-1)- 27-28 Oct.(PK-54300) (j-1) – 2-3-4 Nov.(W-79445)(j-1)

- ***2001****(208.815)*

ONE peak –THREE waves – 6-7 Oct. (PK -37600)(j-1) -11-12-13 Oct.(W-32240)(j-2) – 17-18-19 Oct. (W – 79445)(j-1)

- ***2002*** *(263.351)*

THREE waves –ONE peak – 6-7-8-Oct.(W-46800) (j-1)-10-11-12 Oct. (W -44400)(j-2)-

20-21 Oct. (PK -60900)(j-1)- 29-30-31 Oct.(W-40300)(j-1)

- ***2003*** *(144.496)*

ONE wave – 12-13-14 Oct. (W-69800)(j-1)

- ***2004*** *(249.560)*

THREE peaks – ONE wave – 9-10-11 Oct. (W-36350)(j-1)- 19-20 Oct. (PK -38760)(j-1)-

27 Oct.(PK-43950)(j-1)- 2 Nov. (PK-56800)(j-2)

- ***2005*** *(421.710)*

TWO waves – ONE peak – 11-12-13 Oct. (W-106000)(j-1)- 15-16

Oct.(PK 165900) (j-2)- 23-24-25.26 Oct. (W – 69135)(j-1)

- ***2006*** *(429.560)*

ONE wave – TWO peaks – 13-14-15-16 Oct. (W- 218.416) – 25-26 Oct. (PK-84800)(j-1)- 2 Nov. (PK- 31100)(j-2)

- ***2007*** *(254.286)*

ONE wave – TWO peaks – 4-5-6- Oct (W -47130)(j-0) – 13 Oct.(PK – 71360)(j-1)-19-20 Oct. (PK-62070)(j-2)

- ***2008*** *(407.702)*

THREE peaks – ONE wave – 7-9 Oct.(PK- 78030)(j-1)- 15-16-17-18 Oct. (W-138535)(j-2)- 24-25 Oct.(PK -70040)(j-2) – 29-39 Oct.(PK-55650) (J-1)

- ***2009*** *(314.615)*

ONE peak – TWO waves – 9-10 Oct. (PK – 61150) (j-1) – 13-14-15 Oct. (W-120650)(j-0)- 27-28-29 Oct-(W- 44800)(J-2)

- ***2010*** *(258.582)*

THREE waves – 28-29-30 Sept.-1 Oct. (W-67500) (j-2) – 9-10-11 Oct.(W-79700) (J-1)-

15-16-17-18 Oct. (W-59600) (j-1)

- ***2011*** *(355.655)*

THREE peaks – 8-9 Oct- (PK-156300) (j-1) – 13-14 Oct. (PK-105500)(j-1) – 21 Oct. (PK- 25600)(j-2)

- ***2012*** *(491.833)*

TWO waves – 10-11-12 Oct. (W- 204600)(j-1)- 19-20-21 Oct. (W-198990) (j-1)

- ***2013*** *(844.710)*

THREE peaks – TWO waves – 11-12 Oct. (PK-450800 ***) (j-1) –

15-16-17-18 Oct. (W-103990) (j-2) – 25 Oct. (PK-43200)(j-1) – 31 Oct. (PK -30500)(j-2) – 5-6-7 Nov. (W-95000) (j-2)

- ***2014*** *(562.360)*

TWO waves – ONE peak – 11-12-13-14 Oct. (W-111600)(j-1) – 21-22-23 Oct.(W-162900)(j-2) – 28 -30 Oct. (PK -110500) (j-1)

- ***2015*** *(684.087)*

THREE peaks – 10-11 Oct. (PK-332500)(j-1) – 19-20 Oct. (PK-88100)((j-1) – 26-27 Oct. (PK-77700) (j-1)

- ***2016*** *(779.920)*

THREE waves – 3-4-5-6-7-8 Oct. (W-321100)(j-1) – 12-13-14 Oct. (W-131110)(j-1)-

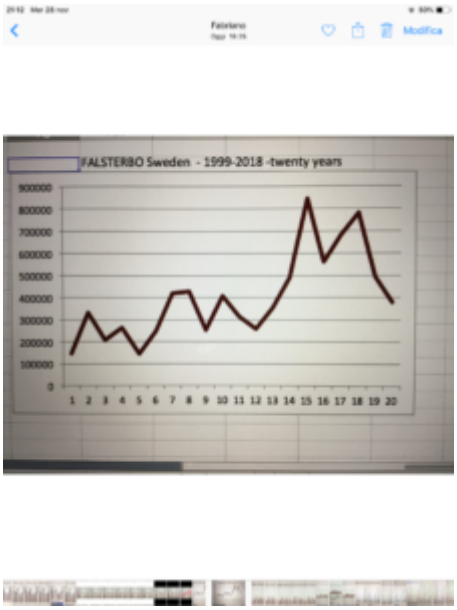
20-26 Oct (7gg) (W-262.870) (j-2)

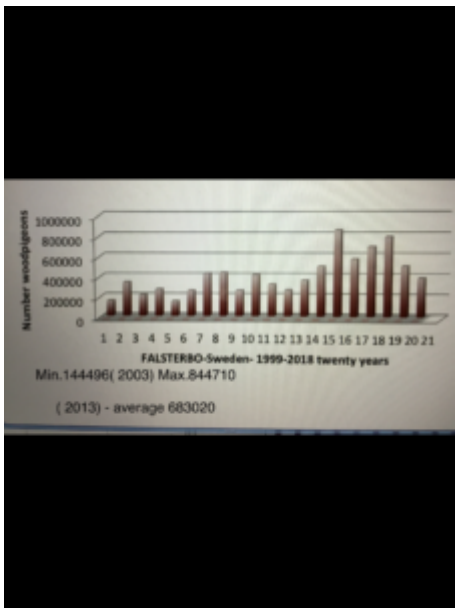
- **2017** (494.300)

TWO waves – ONE peak – 6-7-8-9 Oct. (W-87400)(j-1)- 23-24 Oct (PK-212500)(j-1)-27-28-29-30 Oct. (W-87200)(j-1)

- ***2018*** *(379.610)*

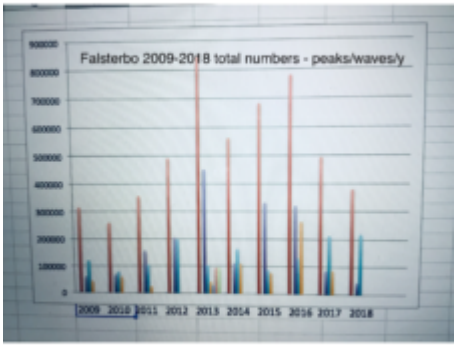
TWO waves – 4-7 Oct. (W-44600)(j-1) – 11-16 Oct.(6days) (W-218900) (j-2)

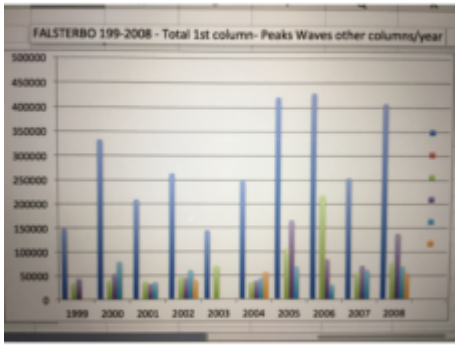
















Comment

In Falsterbo (SE) from 1999 to 2018 (20 years) the Observers counted Woodpigeons in transit

- 660.418 (average/y 683.020 – min.144.496 – max.844.710)
- 134.943 during 60 waves/peaks (average 102.249) – 45{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 13.660.418

- *529.524 during 34 waves (days more than 2 – average 103.809) 25{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 13.660.418 and 57{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 6.134.943 (total of waves and peaks)*

- *605.410 during 26 peaks (1-2 days – average 100.208) – 19{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 13.660.418 and 42{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 6.134.943 (total of waves and peaks)*

Comparing the average between numbers of Woodpigeons recorded during Waves (103.809) and Peaks (100.208) the difference is poor.

During first 10 years (1999-2008) Woodpigeons counted 2.860.965 (average/y 286.096)

During second 10 y (2009-2018) Woodpigeons counted 5.165.672 (average/y 516.567)

during the second ten years (2009-2018) the increment has been 78,8 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

The PC sistema can have changed some numbers during "insert" : some mistakes are possible

GRAPHICS (2014) at https://plus.google.com/photos/103942035281038458760/albums/6086432829554328737

Concerning the specific focus on Air Pressure changes as stimulus to depart (decision making to takeoff by peaks/waves) for Migration (timing from origin and stop-over

sites) –apart all the data related to all abiotic and biotic factors as many reported in graphics- we can underline some conclusions previously reported (…Cavina) and can be assimilated to the current updating (2014-2018).

Air Pressure (AP) *: changes in* ***global growth (1 ° -30 °) in 92.62{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves*** *, variations in growth of* ***over 10 hPa*** *difference in 72,72{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} (48-24 h prior to take-off) and* ***78 , 72{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}*** *in the 18 hours before, to be regarded as the dawn in the study area occurs at around 7 am and the woodpigeons typically move from the woods about 30´-60 'after sunrise. About the time of the take-off and other environmental factors play important roles and temporal scope of an overnight stop, such as night-time temperature, humidity, clear skies or cloudy, rain, wind, moon phase.The values of their base at 7-11 pm (Twilight Night) the night before the take-off point to a Atmospheric pressure in hPa between 1011-1040 53.43{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of peak/waves .The same values in the morning of the take-off and transit (7-11 am) show that 75.45{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves with differential values higher than 1010 hPa.*

Concerning other ***abiotic factors*** *and their influence on the migration-decision-making (****Falsterbo****) other data (1999-2013) are available .*

1) Weather conditions: 74.46{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves correspond to slightly cloudy or clear days.

2) Wind – strength – 41 of 47 peaks/waves with winds of force

between 6-25 km / h, then mostly moderate and evenly distributed properly in the days of transit in peaks/waves.

3) Wind – direction – 42.55{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves with favorable winds predominantly from the North and East on the day of the passage; 38.29{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks with unfavorable winds predominantly from the south and west; 14.89{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks under conditions of moderate variability and / or calm winds.

4) Visibility: 6-10 km in '89.36{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of peaks/waves.

5) Length of Day: calculated in mid-October between 10 h and 10h 45 '.

6) Temperature:-average temperature between 6-20 ° on average, mild- 89, 36{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of peaks/waves

7) Humidity: prevails in absolute terms between 60 -100{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}.

8) Moon: percentage of the lunar surface illuminated over 40{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} in 61,70{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of peaks/waves (statistical significative data)

FRANCE south

PYRENEES – by GIFS –data from ARCHIVES

https://www.palombe.com/migration/comptages.php

1999-2018 : woodpigeons 31.169.768 (*average/y 1.558.488 – min.1.028.000 – max. 2.820.263*) passed through Pyrenees mountains in last 20 years

- ***1999*** *(2.787.626)*

THREE peaks -16 Oct.(PK-108197)(j-1) – 26-27 Oct.(PK-1907721)(j-1)- 4 Nov.(PK -358794)(j-1)

- ***2000*** *(556.987*)

TWO waves – ONE peak – 18-19-20 Oct. (W-434891)(j-1)- 23-24-25 Oct.(W-689783((j-2)- 27-28 Oct.(PK-381373)(j-0)

- ***2001*** *(828.783)*

TWO peaks –ONE wave – 16 Oct.(PK-223442)(j-1) – 24-25-26-27 Oct.(W-675391)(j-1)- 2-3 Nov.(W-300870)(j-2)

- ***2002*** *(2.052461)*

TWO peaks –ONE wave – 19-20 Oct.(PK-237723)(j-2) – 27-28-29 Oct.(W-759472)(j-1) – 5-6 Nov. (PK-485769)(j-1)

- ***2003*** *(1.624.152)*

THREE peaks – 22 Oct.(PK-56050)(j-2)- 25 Oct.(PK-274100)(J-2)- 3 Nov.(PK-1009490)(j-1)

- ***2004*** *(1.820.180)*

THREE peaks – 22-23 Oct.(PK-353168)(j-1) – 30-31 Oct.(PK584070)(j-1)- 3 Nov. (PK-139692)(j-2)

- ***2005*** *(2.477.468)*

ONE peak-TWO waves – 17 Oct.(PK-114122)(j-2)- 24-25-26-27 Oct.(W-1037592)(j-1)- 30-31 Oct.-1-2-3 Nov.(W-1101595)(j-2)

- ***2006*** *(1.520.491)*

TWO waves – 25-26-27-28 Oct.(W-799537)(j-1)- 2-3-4 Nov.(W-563868)(j-2)

- ***2007*** *(1.643.274)*

TWO waves – ONE peak – 19-20-21-22 Oct.(W-657146)(j-2)-27-28 Oct.(PK-416226)(j-2)-6-7-8 Nov.(W-205195)(j-1)

- ***2008*** *(2.208.369)*

TWO waves ONE peak – 17-18-19 Oct.(W-1439480)(j-1) – 23-24-25-26 Oct.(W- 727626)(j-2)- 4 Nov. (PK-205195)(j-0)

- ***2009*** *(1.310.538)*

ONE peak ONE wave – 18-19 Oct.(PK 88479)(j-2) – 26-27-28-29-30 Oct.(W-1108525)(j-1)

- ***2010*** *(1.028.000)*

TWO peaks – 21-22 Oct.(PK-508539)(j-1) – 26-27 Oct.(PK-307565)(j-1)

- ***2011*** *(1.440.469)*

TWO peaks ONE wave – 21-22 Oct.(PK-315616)(j-1)- 31 Oct.(PK 606878)(j-1)-

9-10-11 Nov.(W-390316)(j-1)

- ***2012*** *(2.449.624)*

TWO peaks ONE wave – 18 Oct.(PK-158069)(j-1)- 28-29-30-31 Oct.(W-827050)(j-2) – 8 Nov.(PK-663115)(j-1)

- ***2013*** *(1.596.896)*

TWO peaks – 30-31 Oct. 1367464)(j-1) – 7 Nov. (PK-94832)(j-2)

- ***2014*** *(1.425.747)*

ONE wave – 23-24-(25)-26-27 Oct. (W-1040468)(j-1)

- ***2015*** *(1.895.072)*

TWO peaks TWO waves – 20 Oct.(PK-184230)(j-1)- 25-26 Oct.(PK-112473)(J-2)- 30-31 Oct.-1-2 Nov. (W – 1213297)(j-1) – 6-7-8 Nov. (W-222990)

- ***2016*** *(1.366.943)*

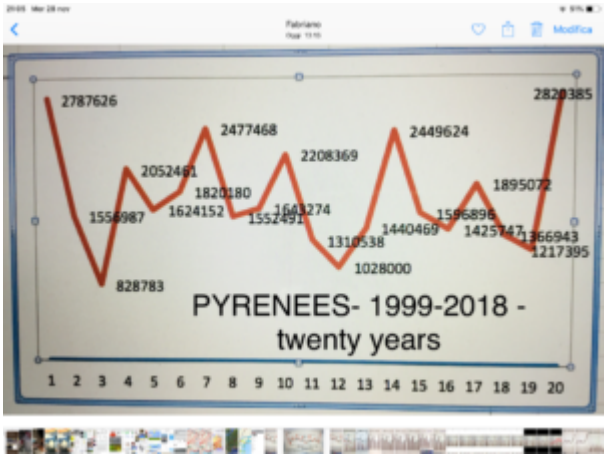
TWO waves – 19-20-21-22 Oct.(W-459321)(j-1)- 29-30-31 Oct.-1-2 Nov.(W-854195)(j-2)

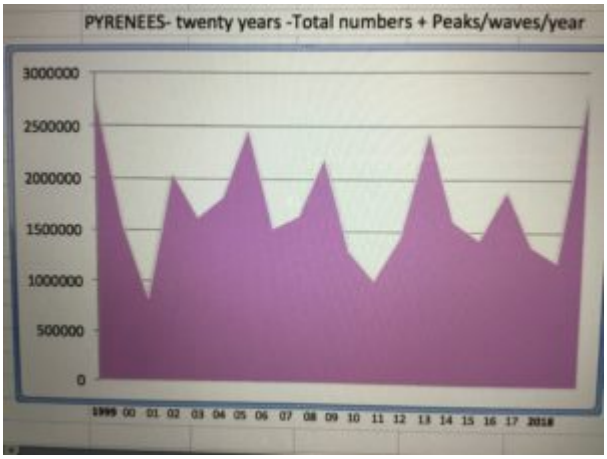
- ***2017*** *(1.217.395)*

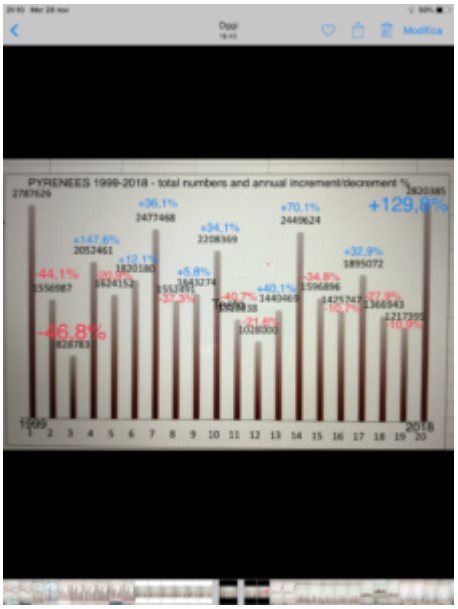
TWO waves ONE peak – 23-24-25-26 Oct. (W-551030)(j-1) – 29-30-31 Oct.(W-468816)(j-0) – 7 Nov.(PK-110980)(j-1)

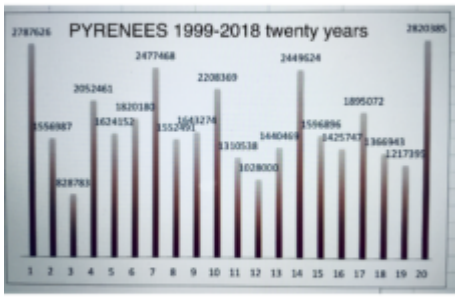
- ***2018*** *(2.820.385) *record/20y*

TWO peaks – 23 Oct.(PK- 1073055)(j-1) – 3-4 Nov. (PK – 1638482)(j-1)

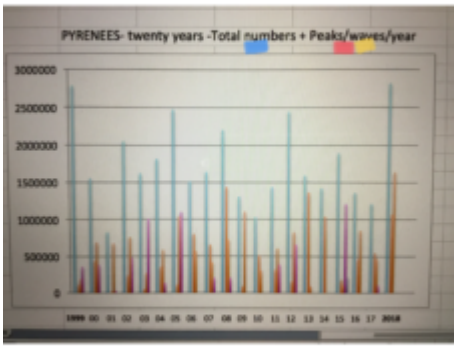


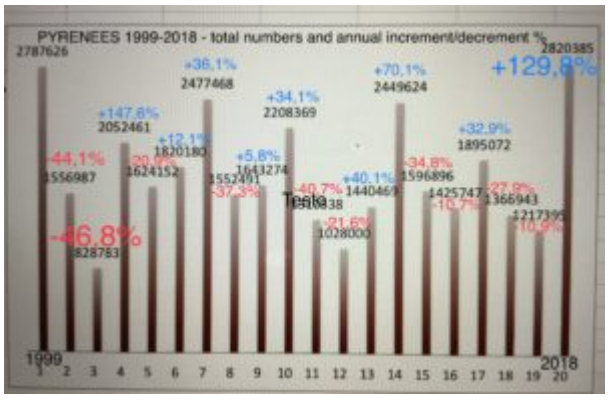












Comment

In Pyrenees (France) from 1999 to 2018 (20 years) the

Observers GIFS counted Woodpigeons in transit 31.169.768 (*average/y 1.558.488 – min.1.028.000 – max. 2.820.263*)

- 816.493 during 52 waves/peaks (average 592.624) – 98,8 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the total 31.169.768

- *227.584 during 21 waves (days more than 2 – average/w 772.242) 52,06 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of* 31.169.768 (*total 20y*) *and 52,65 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 30.816.493 (total of waves and peaks)*

- *588.909 during 31 peaks (1-2 days – average 470.609) – 46,80 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 31.169.768(total 20y) and 47,34{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of 30.816.493 (total of waves and peaks)*

Comparing the averages between numbers of Woodpigeons recorded during Waves (772.242) and Peaks (470.609) the difference is great with a {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} increment of 64,1{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} between Peaks and Waves

During first 10 years (1999-2008) Woodpigeons counted 19.517.102 (average/y1.951.710)

During second 10 y (2009-2018) Woodpigeons counted 11.652.660 (average/y 1.165.266)

during the second ten years (2009-2018) the decrement has been 67,5{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

Comparing the two decades ,the increment in Falsterbo (Sweden origin/breeding area) 78,8{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} as indicative of growing up of the Scandinavian populations , and the decrement in Pyrenees (transit area to Extremadura-Spain-Portugal) 67,5 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} ,it seems that it's possible interpreting this difference : despite the growing up of the Species at the origin areas and at monitoring sites on Mediterranean flyway , most populations prefer to stop wintering in France reducing the length of migration . Anyhow the record of 2018 (2.820.325 in two peaks)seems contradicting this ten-years-trend .

GRAPHICS (2014) at https://plus.google.com/photos/103942035281038458760/albums/6086432829554328737

Concerning the specific focus on Air Pressure changes as stimulus to depart (decision making to takeoff by peaks/waves) for Migration (timing from origin and stop-over sites) –apart all the data related to all abiotic and biotic factors as many reported in graphics- we can underline some conclusions previously reported (…Cavina) and can be assimilated to the current updating (2014-2018).

Commenting on the reading table – graphics (2014) of the results, we highlight some aspects –almost specular as for

Falsterbo – more related to abiotic factors, analyzed on the two temporal "48h/36/24h" and "18h"

prior to take-off.

We note:

– Weather conditions almost never ever disturbed and mostly clear-cloudy;

– Winds of moderate strength with rates prevailing directions from the East to Southeast;

– The maximum visibility always 6-10 km;

– Length of day between 9:30 a.m.-11h 'and dawn hours. 7.30 to 8 am

– Almost always mild temperature

– Humidity greater than 81{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} in about 70 5 peaks/waves

– Phases of the moon with the illuminated surface of the moon more than 40{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} in 56,76{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of peaks/waves.

– ATMOSPHERIC PRESSURE or AIR PRESSURE (AP) : in 92,85{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves there was increase (1-30 hPa) with variations above 10 hPa in 75.80{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a

88d1abe5} of the peaks/waves for the sector “36/24 h” and 76.19{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} for the sector

“18 h” before the take-off.

All this confirms the analysis-as “Sweden” – that even in the decision to terminate the stop (stop-over) more or less prolonged the increase in atmospheric pressure event is almost absolute and most important of entities, and what constitutes an acquisition of absolutehighlight: the increase of the atmospheric pressure likely identified with “the finger pressing “ result is not absolute because the 7.14{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves atmospheric pressure did not increase or even decreased. And possible variables must be considered attributable to the environmental conditions of the parking influential on abiotic and biotic factors. It should be noted therefore further confirms that the atmospheric pressure is the safety factor for the decision to takeoff to migration and realized more specifically in the afternoon / night before take-off: 90.47{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the peaks/waves in the atmospheric pressure is higher than 1010 hPa and more sectorally in 50.70{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} (previous day) and 66{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} (Day of the take-off) is higher than the atmospheric pressure at 1020 hPa. The data of 66{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} (day of Take.Off) of the stop-over France should be put in comparison with similar 53.43{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} in Sweden. Similarly, the investigation of Falsterbo-Sweden, we extrapolated 15 peaks/waves with magnitude of transit above the global average of 42 peaks: in

this case we could not detect significant differences with respect to the overall characteristics of all the peaks/waves .

Some conclusion-comment about Sweden-France's data : during a long period of 20 years (1999-2018) 44.830.138 woodpigeons (Columba palumbus) were recorded by Observers Researchers of official local Institutions and 112 peaks/waves have been identified by retroactive licensed analysis connected with precedent work (1999-2013 results)(…) and more than 90 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the migration-takeoffs happened after a significant documented growth of Air Pressure 12-48 hours before the events .

ITALY-by Club Italiano del Colombaccio " Progetto Colombaccio" (41 – 31)

https://www.ilcolombaccio.it/CMS/
http://journal.ilcolombaccio.it/

If the above-mentioned materials-methods-results were related to foreign experiences by high levels of Research and Institutional organization , in Italy a similar experience monitoring the woodpigeons' migration started by the single pioneering enterprise of Rinaldo Bucchi (Club Italiano del Colombaccio) with the sharing of more than hundred hunters-observers ("Citizen science" policy) member of Club Italiano del Colombaccio , in a research-project named in 1997 " Progetto Colombaccio ".

The data collected monitoring the woodpigeons'migration in Italy (Citizen science) for 10 year became basic for the dignity of an International paper (35) :

< Cavina E.,Bucchi R.,Busse P. – (2018) – The General Pattern of Seasonal Dynamics of the Autumn Migration of the Wood Pigeon (Columba Palumbus) in Italy – THE RING 40 (2018) 10.1515/ring-2018-0001and https://www.researchgate.net/publication/328336987 >

where the analysis of peaks and waves has defined a standard methodology on the specific item. The same data have been previously reported to be compared with the Sweden-France results by focus on Air Pressure changes and migration-peaks-waves in Italy .

ITALY data collected in Archives of "Progetto Colombaccio" Club Italiano del Colombaccio (Head of the Team Rinaldo Bucchi) – Official Migration counts on 4.831.138 woodpigeons counted 1998-2007 (10 years) – 12 peaks/waves of migration . **Details** of the analysis are in http://www.scienceheresy.com/ornithologyheresy/Cavina2015.pdf

ITALY 1998-2007 : 12 peaks/waves

4.831.138 birds (annual average 483 831)

-1998 – 15 October (8 days)

-1999 – 27 October (2 days)- 8 November(4 days)

-2000 – 14 October (8 days)

-2001 – 11 October (5 days)

-2002 – 20 October (2 days)

-2003 – 16 October (2 days)

-2004 – 19 October (2 days)

-2005 – 12 October (6 days)

-2006 – 26 October (3 days)- 4 November (3 days)

-2007 – 15 October (2 days)

In November we have considered only two significant

peaks over 10 .

Comment

About the data collected in Italy we can detect important elements as following.

In the period 1998-2007 (ten years) with the collaboration of 115 observers of the Club of Woodpigeon, were surveyed in transit 4.831.138 birds (annual average 483 831) and have been identified 10 migratory PEAKS/waves (min.1g. -max.6gg) in October and 10 peaks/waves in November (here used two). Hours of transit were: rise-9 am (52{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}), 9-14 h (25{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}), 14-h night (23{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}) Consistency of flights observed: from 1 to 50 birds (82{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}), from 51 to more than 300 (18{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}) Average number of annual observation point: 3,963 birds Age (only from game bag):

20{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} young, 28{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of young adults 52{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} The "waves of step" (fury) account for 15-20{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of total migration (as questionable and approximate). The maximum value (annual) of sightings was in Veneto and Friuli (door Migration Center-East) in 2002: 18,683birds ; and the minimum value in the Basilicata region in 2003: 416 birds.

Concerning the Air Pressure we were confronting FOUR AREAS along the MIGRATION ROUTE from "nesting areas " and "stop-over areas" (possibly mixed) on Long – Medium – Short distance (A-B-C) arriving to the "transit area in Italy" (D), with the following results about

– Changes in atmospheric pressure (AP) 48/36/24 h prior to takeoff in the areas of origin

– VALUES absolute core of the PA in the 12 h prior to takeoff in those areas.

– CHANGES: -in the long distance remote areas (more than 1500 km) he A.P. increased (78-48 h

before transit in Italy) 67 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5};

-in the most remote and continental stop-over areas (Medium and short distance) in the A.P.

48/36/24 h prior totakeoff and the day of detection of the peak (in ITALIAN) rises by more than 10

hPa in 90 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5} of the Peaks/waves

– The same: in the intermediate areas and closer to the coast (short distance – 24-12 h. before

take.off) , the most significant of " takeoff of the day "(latitudes 47 ° 30 ', 46 ° 03', 45 ° 20 ', 41 °

53´), the increase is more than 90{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

-Values Absolute: in the most remote and interior the basic values of PA – 12 hours before – are

higher than 1010 hPa in the 75-100{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

– The same: in the intermediate areas the basic values greater than 1010 hPa are in the 50{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}
-66{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

and in the areas closest coastal 83.33{a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}

– Check-in (ITALY) the absolute values of the basis on the first day of the peak/wave are higher than 1010 hPa 50 {a6be835d09a84c463fa955f66368ad74671de57ffb293aa26834595a88d1abe5}.

All of these data-elements – found, as mentioned above, with precise detail (day by day, hour by hour) taken from the website Weather History (historical archives) freely available

on the Internet, and transferred to paper ballots useful for comparative examination – there seem to indicate clearly that trust with the abiotic factor most decisive fledging mass migration (fury) is readily identifiable in the "overhang" – more or less progressive or sudden, but always such – above 10 hPa 48-12h before takeoff. " It 'important that this data "ITALY" (4.83138 million census – 1998 to 2007 – 12 Peaks/waves) – particularly for 48-36 h before the start of raising – line up with a similar finding in the Pyrenees (census 27,354,388 Pigeons 1999-2013 – 42 peaks) being the areas of takeoff of the first day of peak/wave, all areas of prevailing stop-over more or less prolonged. More properly in the Nordic nesting area (Sweden) (10,760,141 census Pigeons -1999-2013 – 47 peaks) the "overhang" of PA is steeper and closer to the time of the first takeoff mass migration (12- 24 h before). It should be noted that all data collected are drawn from a global basis (Sweden-Italy-Pyrénées) of 42,945,909 woodpigeons actually surveyed in transit flight in 10-15 years and featuring 101 occasions flying of peak migration (1- 6 days).

*The " **temporal extension of the Research** "(November 2018) has enabled an analysis of both the*

*predictions of both the actual feedback directly in the field **(" on the field ")** in the more recent migratory seasons, realizing itself as an analysis of" live ", that can also be critical when viewed in the rigidframework of a scientific research, but in fact collect tangible proofs of the relationship between abiotic factors (including atmospheric pressure) and massive takeoff and mass flows in the*

migration.

In 2014 in ITALY: the performance of the full migration (with "peaks") was characterized by differences in weather

*conditions between the Tyrrhenian Sea area (cyclonic vortex beginning of October) and the Adriatic Sea area (entrance from the Balkans – High Pressure permanent) with – Early mass influx of October 7 to 9 on the side of the Adriatic Sea – More late influx of mass 23 to 24 October on the Tyrrhenian side Very important were the massive takeoffs observed directly (http://www.ilcolombaccio.it/): – 19- October 23 from the woods of St. Rossore (Pisa-Livorno) * – October 20 forests in Adriatic area -PesaroUrbino – October 25, Mesóla forest (Ferrara) * – 25 to 27 October Monte Conero (Ancona) – November 2 (flow) – Grosseto area Tirreno The phenomena of takeoff "strip" of thousands and thousands of pigeons, at dawn, and S.Rossore and Mesola have been documented with videos and photographs. All mass migration (2014) – as regards the abiotic factors – were characterized by gradual growth conditions (stability of high atmospheric pressure equal to or greater than 1020 hPa) or rapid increase of 36-12 h. prior to fly both on the Adriatic Sea both on the Tyrrhenian Sea All mass takeoffs migration from the Italian stop-over areas were characterized by rapid increases in PA with changes (24-12 h) of more than 10 hPa.*

Many other documented takeoffs (2014-2018) after jumps of Air Pressure more than 10 hPa in the stop-over area in Italy are documented in https://www.ilcolombaccio.it/CMS/category/colombaccio-scientifico/-

Many of these takeoffs have been forecast by the daily control of forecast Air Pressure graphics in many Meteo-websites : the precision of forecasts is an important support to the scientific methodology .

It's emblematic the takeoff of 200-300.000 woodpigeons 31 October 2017 from Mesola forest (Ferrara-Italy) fully documented and by the video https://youtu.be/pGK6z9SY8Cg (Denis Bianchi -2017) and our forecast 4 days before the event .

In 2017 the Club Italiano del Colombaccio has producted an experimental project by a WebApp (MCL) to monitoring daily/hourly the autumn migration by cooperation of registered Observers on a Italy'map real-time on-line . The MCL results of 2017 (37) are at *http://www.scienceheresy.com/ornithologyheresy/Woodpigeons.pdf*

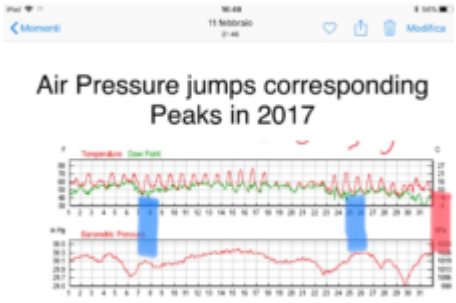
7 -9 Oct. – One wave – 40.795 woodpigeons by 676 sightings –AP jump 13 hPa

25-26 Oct–One peak – 55.945 woodpigeons by 645 sightings – AP jump 23 hPa

31-Oct.-! Nov.-One peak – 205.950 woodpigeons by 172 sightings- AP jump 27 hPa

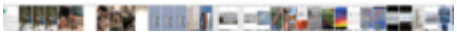












In 2018 MCL as experimental method has encountered some technical problems ,but some data are indicative

11-15 Oct. – One wave – 58.615 woodpigeons – AP jump 15 hPa

20-21 Oct. – One peak – 37.880 woodpigeons – AP jump 21 hPa.

All (2017-2018) peaks/waves have been previously predicted by AP-meteo-forecast and focus on AP forecast-graphics 5 days

before .

All the ITALY's data (1999-2007 and 2014-2018) – also directly from the field as in the last years – confirm the prevalent influence of AP jumps on the migration's "decision making" .

Other retroactive analysis of relationships between AP changes and birds'migration has been reported for other 4 birds' specie as by "THE PARA-TYMPANIC ORGAN of VITALI: the challenge of bird sensory physiology." 2016 – http://www.scienceheresy.com/ornithologyheresy/Cavina2016.pdf (39)

"*we analyzed abiotic factors on the origin Scandinavian-Russian breeding areas for four more bird species in addition to the Woodpigeon. We have selected 60 migratory mass peaks of transit of the Eurasian Siskin, the Chaffinch/Brambling, the Common Starling, the Common Woodpigeon and the Barnacle Goose. The detailed relationship between mass take-off and changes in Atmospheric Pressure (plus other abiotic factors) 48-12 hours before starting has been analyzed . – (A) – 6 peaks not significant – (B) – 6 peaks moderately significant (7-10 hPa difference) – (C) – 48 peaks strongly significant (10 – 20 hPa difference) The supposed role of the Para-Tympanic Organ of Vitali (PTO) is underlined and further investigated.*"

documented "evidence based" data concerning the Text are available at

https://photos.google.com/share/AF1QipM79yvIsGsLOiiwU_wuU3evW2-Kpqk1jTfMZwQ6dw6zRUS44mmb0S2dA2uCXPn5Ag?key=QXFxeDMzVUV0WTcxbnNlRG43RlJhYjJOcXlRbnh3

DISCUSSION

Some elements of above-mentioned items (comments) have been already directly discussed. (41-39)

Taking attention to the target of the present paper (PTO and scientific investigations) other items must be considered .

- PTO has been discovered more than a century ago by a single genial Researcher using no more than a microscope and histological procedure of that time .(1)
- Identification of specific supposed physiological relationships was genial already (barometric/altimetrical sense).(1-28)
- Controversial items have been developed at that time but the specific barometric supposed function remained valid . (14-15)
- Many specific research fields are unexplored and still not investigated.
- Evolution's implications from fishes to birds are well documented by many researches and are still fascinating.(30)

Concerning this last item ,many evolutionary theories about sense-organs have considered PTO.

" *The amniotic PTO develops from a previously undiscovered sensory placode "(O'Neill 2012….)*

"PTO stems from a unique placode ……placodes are specialized patches of thickened embryonic skin from wich sense organs develop ….it will be interesting to use molecular techniques to determine whether the PTO placode starts to develop in mammals , even if this organ itself is not formed …." " After initial excitement wich led to Vitali being nominated for the

1934 Nobel Prize in Physiology or Medicine , its existence was largely forgotten and ignored "(Baker C. – Sept.2012…) and we can affirm " still in present 2018 time forgotten and ignored to be able to attract curiosity and research in modern sense's ecology " .

Other generalist consideration is in Web-literature *: " During the middle part of 20th Century the strange story of the <organ of flight> passed quietly into the annals of Science and was almost forgotten" . New technologies show the ability of birds to move themselves in changing Air Pressure conditions " but something else is needed. Remember Prof.Vitali's PTO ? Let take a closer look at it….. And –although conclusive proof still waits on some ongoing research – many Scientists are becoming convinced that this (PTO) is the missing piece of the puzzle . Satellite tracking has shown that* ***long-distance migrants can maintain a constant altitude*** *……they are able to do this within a few tens of meters ,also in total darkness ….the only way this could be possible is if birds have a built-in "altimeter" and PTO as Air Pressure sensor fits the bill perfectly " …and " sensing the weather in advance" (by Skyscanner Paul Wildlifewriter – 14 Sept.2013 < The weather and migrating birds –http://thewildlifewriter.blogspot.com/2013/09/skyscanner.html >"*

The specific Literature'refences' support remains poor after (2014-2018) full Bibliography overview reported by Giannessi F. (8) and our updating (41) .

At the same time it seems unacceptable to us that relatively ancient (1950) and almost modern (1998) papers have not considered PTO in discussion and bibliography . Most recent sample of this forgotten bibliography is an excellent paper concerning altitude and fly of birds at twilight exploring in depth the relationships with AP changes in altitude and no mention about PTO (Behavioral Ecology and Sociobiology

(2018)72.45 – Swiss Ornit.Inst.) : it could be right remember the motto of Prof.Vitali " no science without anatomy ".

Apart the basic items discussed and related comments concerning the status of knowledge about PTO physiology , we have reported updated details in a precedent paper on-line as "*Finally, we emphasize that the sensor terminal of the changes in atmospheric pressure can be easily detected in the organ Para-Tympanic (PTO) Vitali, which studied for the first time by Vitali in Italy in the early decades of the last century, still the subject of extensive research morphological and functional :if "the finger pressing" can be discerned in the changes of atmospheric pressure (the "overhang"), "click" on which the press is probably the Paratympanic organ of Vitali, having to consider all the neuro-functional integration with the adjacent structures in the inner ear (Lagena, vestibular apparatus) until the centers of the Brain and Cerebellum* "

Anatomy : *https://plus.google.com/photos/103942035281038458760/albums/5802521945641185121*

von Bartheld CS.- Functional morphology of the paratympanic organ in the middle ear of birds. –Brain Behav Evol. 1994;44(2):61-73.-

http://www.ncbi.nlm.nih.gov/pubmed/7953609

By this way the discussion can evolve to anatomo-physiologic items .

ANATOMY at the special Link

https://plus.google.com/photos/103942035281038458760/albums/5802521945641185121



In a current analysis and bibliographic review concerning anatomo-physiologic elements of PTO , we are surprised to discover that nothing is described or studied about the fluid (muco-gelatinous) present inside PTO saccula wich obviously has a role to transmit AP changes and forces (including gravitational,electromagnetic,moon phases variations) to the sensitive hair-cells of PTO. These molecular elements of this fluid (as +/- iones,Ca,K,proteins'architecture) will be very probably similar to the electo-chemical composition of the fluids in the inner ear (*Thalmann I, Hughes I, Tong BD, Ornitz DM, Thalmann R. Microscale analysis of proteins in inner ear*

tissues and fluids with emphasis on endolymphatic sac, otoconia, and organ of Corti. Electrophoresis. 2006;27(8):1598-608.) . These elements and their electrochemical functional activity could be specific to "inform" the hair-cells sensors about the AP changes ,together the physical force received and transmitted by the tympanic membrane and its ligaments connected with PTO .All these electro-chemical-molecular interactive elements are still unexplored .The ancient and present (1986-2010) knowledges concerning the fluid function in inner ear and acustic and vestibular physiology could be a guide-line to develop new researches focused on PTO's fluid. (ISVR Technical Report 135, 1986 The effect of changes in cerebrospinal fluid pressure on the labyrinth in terms of tympanic membrane displacement. Tweed JJ, Marchbanks RJ and Martin AM. ISVR, Southampton University, Technical Report 135, 1986 -//- Maria del Socorro Hernandez-Montes Study of tympanic membrane displacements with digital holographic interferometry Proceedings Volume 7387, Speckle 2010: Optical Metrology; 73871C . ISVR, Southampton University, Technical Report 135, 1986 -//- Maria del Socorro Hernandez-Montes Study of tympanic membrane displacements with digital holographic interferometry Proceedings Volume 7387, Speckle 2010: Optical Metrology; 73871C)

Remaining on the same electophysiological field concerning transmission and modulating stimulus ,better ultrastrucutral studies on the structures of PTO hair-cells and their nerves' connections – also with Lagena,coclear system,brain's area – perhaps could be developed by new electro-microscopical technologies (https://www.cell.com/current-biology/pdfExtended/S0960-9822(17)30730-3 Electron Microscopic Reconstruction of Functionally Identified Cells in a Neural Integrator) ..

The complexity of all these questions/answers related to "AP changes &PTO" is evident and open to better modern researches

.

Many other strictly ornithological research items could be discussed as by ornithological research model proposed “on the field “ (experimental behaviour monitoring in wild birds on the field , related to AP changes) (“La Migrazione autunnale del Colombaccio in Ialia “ book&E-book by Aracne Editrice – Rome-Italy – 2018) (36)

CONCLUSION

The present paper together with the personal bibliography (2013-2018) could be easily marked as a fruit of a fantasy-work of a dilettante . We try to affirm that this work could be accepted as a work managed by a scientific personal background of the Author supported by the “Citizen science” (Italian Journal Woodpigeon Research – Journal on-line – http://journal.ilcolombaccio.it/) spirit of many members of Club Italiano del Colombaccio .

The collecting data methodology and analysis have been developed for many years by serious work on the field and on the writing tables . It was heavy but managed by determination : all the reported data are true and many times controlled and discussed also with criticism.

The “evidence based” data – also if reported by raw numbers – shows the evidence of the decisive role of Air Pressure changes in the “decision making” of birds Migration in Europe and in Italy .

So important stimulus –together with other abiotic-biotic factors – must have a body-target-platform where itself stimulus can put its force .

New technologies(Satellite – radio-tracking) show the ability of birds to move themselves in changing Air Pressure

conditions : therefore in the body of the birds some sensors must be able to receive and manage this physic stimulus .

More than a century ago Giovanni Vitali discovered the Para-tympanic Organ as a new sensitive organ linked with barometric and altimetric functions , expression of this physiologic evolutive destiny from fishes (prufondimeter) to birds (altimeter) (28- 30- 20-19)

Despite many sporadic (one Century) and documental researchers' efforts (6 > 34),conclusive proof still waits to be accepted . "Evidence based" data of our retroactive and real-time research in Europe and Italy (wild birds) (35 > 43) should be able to convince new Researchers and Institutions to develop new investigations and new methods to solve in depth the PTO mystery .

The appeal of F.Giannessi (2014) (8) is still unheeded : " *PTO is used daily by enormous number of living animals (200-300 billions of birds) but represents currently one of the major unsolved mysteries and challenges in sensory physiology of vertebrates* " .

The mystery of https://youtu.be/pGK6z9SY8Cg is still open to be investigated .

Our position of "dilettante" Author of the above – text , let us free from Academic liturgical obligations : we have not and never will have –as dilettante- the power to develop suitable new institutional specific Research's efforts , but we have the freedom to cry our aware indignation to the Science .



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